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for Imaging Materials –
Photographic Processed Films, Plates, and Papers – Filing Enclosures and Storage Containers

ANSI/PIMA IT9.2-1998

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IT9.2-1998

Revision and redesignation of
ANSI IT9.2-1991

American National Standard
for Imaging Materials –

Photographic Processed Films, Plates, and Papers – Filing Enclosures and Storage Containers

Secretariat

Photographic & Imaging Manufacturers Association, Inc.

Approved April 15, 1998

American National Standards Institute, Inc.

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Foreword

(This foreword is not part of American National Standard ANSI/PIMA IT9.2-1998.)

Photographic materials, including black-and-white and color reflection prints, films, plates, and diazo prints and transparencies, have become increasingly important as documentary and pictorial reference materials in libraries and archives, government, commerce, and academia. This has focused attention on the importance of preservation of such materials to ensure their longest possible life.

The stability and useful life of photographic materials depends on their physical and chemical properties, as well as on the conditions under which they are stored and used. The important elements affecting the useful life of photographic materials are humidity and temperature of the storage environment; the hazards of fire, water, and light exposure; fungal growth; contact with certain chemicals in solid, liquid, or gaseous form; physical damage; proper processing; and the enclosures and containers in contact with the photographic material.

Four standards have been written specifying the stability requirements for different types of photographic film: ANSI/ISO 10602-1995, ANSI/NAPM IT9.1-1996, *Imaging materials – Processed silver-gelatin type black-and-white film - Specifications for stability*; ANSI/ISO 8225-1995, ANSI/NAPM IT9.5-1996, *Imaging materials – Ammonia-processed diazo photographic film - Specifications for stability*; ANSI/ISO 9718-1995, ANSI/NAPM IT9.12-1995, *Imaging materials – Processed vesicular photographic film - Specifications for stability*; and ANSI/NAPM IT9.19-1994, *Imaging media (film) – Thermally processed silver microfilm - Specifications for stability*.

Recommended storage conditions are given in the following standards for different photographic materials: ANSI/NAPM IT9.11-1993, *Imaging media – Processed safety photographic films - Storage*; ANSI/NAPM IT9.18-1996, *Imaging materials – Processed photographic plates - Storage practices*; and ANSI/NAPM IT9.20-1996, *Imaging materials – Reflection prints - Storage practices*.

This standard, ANSI/PIMA IT9.2, is an auxiliary document and deals specifically with the enclosure materials used in storage. It pertains to the materials used in filing enclosures, containers, and albums, as well as to construction details used in folders, sleeves, jackets, envelopes, pocket pages, and slide mounts. In addition, ANSI/NAPM IT9.16-1993, *Imaging media – Photographic activity test*, describes the test method used to evaluate filing enclosure materials for photo-reactivity (referred to in this standard).

The term "archival" is no longer used in American National Standards for defining optimum storage conditions and enclosures, because the meaning of "archival" has become too ambiguous. In common usage, "archival" has been used to mean that documents can be preserved "forever". The new terms, when applied to the above storage standards are extended-term and medium-term. Likewise, enclosure materials should not be referred to as "archival", but rather as meeting the specifications of this standard and ANSI/NAPM IT9.16.

This standard contains two annexes, both of which are informative and not considered part of this standard.

Suggestions for improvement to this standard will be welcome. They should be sent to the Photographic & Imaging Manufacturers Association, Inc., 550 Mamaroneck Avenue, Suite 307, Harrison, NY 10528-1612; e-mail: natlstds@pima.net.

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This standard was processed and approved for submittal to ANSI by PIMA Technical Committee on the Physical Properties and Permanence of Imaging Materials, IT9. Committee approval of the standard does not necessarily imply that all members voted for its approval. At the time it approved this standard, the IT9 Committee had the following members:

Peter Z. Adelstein, Chairman
Steven T. Puglia, Vice-Chairman
A. Tulsi Ram, Secretary

Organization Represented	*Name of Representative*
Photographic Imaging & Manufacturers Association, Inc.	Edgar Draber
	Joseph Helm
	Ron Hiller (Alt.)
	Kazuo Kato
	Atsushi Tomotake (Alt.)
	David F. Kopperl
	Gale Aaroe (Alt.)
	A. Tulsi Ram (Alt.)
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First Image Management Company	William E. Neale
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Sony Corporation	Kengo Ito
U.S. Library of Congress	Gerald D. Gibson
U.S. National Archives and Records Administration	Steven T. Puglia
	Alan R. Calmes (Alt.)
	Sarah S. Wagner (Alt.)
Wilhelm Imaging Research	Henry Wilhelm

Individual Experts

Eugene Ostroff
Scott A. Williams

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Introduction

When filing processed films, plates, or papers, it is customary and good practice to enclose these photographic materials in envelopes, sleeves, folders, or other forms of enclosure to exclude dirt, protect them against mechanical damage, and facilitate identification and handling.

Storage conditions for photographic records can be designed for extended-term preservation or for moderate periods of time. The storage protection required in each case will differ in degree according to the cost of providing storage facilities, the desired record life, and the frequency of record use. Storage conditions shall be chosen within specified limits in order to obtain a satisfactory compromise between the degree of protection required and the practical consideration of immediate availability.

Specifying the chemical and physical characteristics of the photographic and enclosure materials does not, by itself, ensure satisfactory storage behavior. It is essential also to provide proper storage temperature and humidity, as well as protection from the hazards of fire, water, and fungal growth; from contact with certain chemicals in solid, liquid, or gaseous form (e.g., atmospheric pollutants); and from physical damage.

Furthermore, different types of photographic materials may respond uniquely to varying storage conditions. Since solid particles abrade prints and negatives when being slid in and out of filing enclosures or when stacked items are sorted, and because such particles can sometimes be chemically destructive to images and base materials, clean, dust-free storage areas are essential.

Atmospheric conditions, natural and man-made, shall be controlled since paper and plastic enclosures are permeable and they do not protect the photographic image from environmental effects. Such effects include non-recommended relative humidities, or atmospheric pollutants such as hydrogen sulfide, sulfur dioxide, nitrogen oxides, and peroxides. (See ANSI/NAPM IT9.11-1993, *Imaging media - Processed safety film - Storage*; ANSI/NAPM IT9.18-1996, *Imaging materials - Processed photographic plates - Storage practices*; and ANSI/NAPM IT9.20-1996, *Imaging materials - Reflection prints - Storage practices.*

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American National Standard
for Imaging Materials –

Photographic Processed Films, Plates, and Papers – Filing Enclosures and Storage Containers

1 Scope

This standard sets forth the principal physical and chemical requirements for filing enclosures, albums, and containers particularly designed for storing processed films, plates, and papers. The photographic image may be silver-gelatin type, color (dye-gelatin), or diazo.

This standard applies to storage copies and does not include work copies as defined in annex A. The requirements are limited to the characteristics that may affect the enclosed item chemically or physically when it is stored under recommended conditions. (For methods of proper storage, see ANSI/NAPM IT9.11, ANSI/NAPM IT9.18, and ANSI/NAPM IT9.20.)

2 Normative references

The following standards contain provisions that, through reference in this text, constitute provisions of this American National Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this American National Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ANSI/NAPM IT9.11-1993, *Imaging media – Processed safety film – Photographic films – Storage*

ANSI/NAPM IT9.16-1993, *Imaging media – Photographic activity test*

ANSI/NAPM IT9.18-1996, *Imaging media – Processed photographic plates – Storage practices*

ANSI/NAPM IT9.20-1996, *Imaging materials – Reflection prints – Storage practices*

ASTM D1030-1995, *Standard test method for fiber analysis of paper and paperboard, Appendix X5* [1)]

ISO 699-1982, *Pulps – Determination of alkali resistance* [2)]

TAPPI 236cm-85, *Kappa number of pulp* [3)]

TAPPI T406om-94, *Reducible sulfur in paper and paperboard* [3)]

TAPPI T408om-88, *Rosin in paper and paperboard* [3)]

TAPPI T429cm-84, *Alpha-cellulose in paper* [3)]

TAPPI T509om-96 , *Hydrogen ion concentration (pH) of paper extracts (cold extraction method)* [3)]

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1) Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428.

2) Available from the American National Standards Institute, 11 West 42nd Street, New York, NY 10036.

3) Available from the Technical Association of Pulp and Paper Industry, Box 105113, Technology Park, Atlanta, GA 30348.

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[1] Carroll, J.F.; Calhoun, J.M. Effect of nitrogen oxide gases in processed acetate film. *Journal of the Society of Motion Picture and Television Engineers* 64: 501-507;1955 September.

[2] Henn, R.; Wiest, D.G. Microscopic spots in processed microfilm: Their nature and prevention. *Photographic Science and Engineering* 7:253-261; 1963 September-October.

[3] Ostroff, E., Preservation of photographs. *The Photographic Journal:* 309-314; 1967 October.

[4] Pope, C.I., Blemish formation in processed microfilm. *Journal of Research of the National Bureau of Standards: Ad -Physics and Chemistry* 72A(3): 251-259; 1968 May-June.

[5] Reilly, J.R.; Nishimura, D.W.; Pavao, L.; Adelstein, P.Z. Photograph enclosures: Research and specifications. *Restaurator* 10:102-111; 1989.

3 Materials

3.1 General

The enclosure material should be free of acids and peroxides that may be released slowly with time and cause degradation to the image or various components of the photograph. For example, aging blemishes in processed silver gelatin microfilm may be caused by chemicals such as peroxides evolved from the paper [2,4][4)]. Likewise, the presence of acid in paper can cause paper degradation.

The enclosure itself shall be chemically stable. Otherwise, the decomposition products might be harmful to the photographic material, and dirt or dust might be produced that could scratch or become embedded in the image surface. Cellulose nitrate, polyvinyl chloride, and glassine sheeting are examples of enclosure materials that are either chemically or physically unstable, and shall not be used [1,3].

The surface of the enclosure material is also important. The enclosure shall not abrade the photograph. While a slightly textured or matte surface is recommended for the filing enclosure to minimize ferrotyping (see below), a rough surface can produce abrasion problems. There may be other harmful physical characteristics of the enclosure material that may develop under adverse environmental conditions e.g., elevated relative humidity. These include wrinkling and distortions common to glassine paper or ferrotyping of the image surface, i.e., local or overall glazing that can result from contact under pressure with smooth, glossy, plastic enclosure materials. Finally, enclosures shall be of sound and sturdy construction so that the enclosure functions properly during use, without seams or fabrication components failing or otherwise damaging the photographs during storage.

Paper, cardboard, and plastic enclosure materials, slide mounts, inks, and adhesives shall meet the requirements of the photographic activity test as described in ANSI/NAPM IT9.16. This incubation test determines whether these materials have a chemical interaction with silver, color, or diazo images or cause stain in a gelatin binder [5]. The photographic activity test is also applicable for testing chemical interactions caused by album storage materials.

If a particular brand of commercially-made paper, cardboard, or plastic enclosure material, ink, and adhesive is found to be safe for long term storage purposes (passes ANSI/NAPM IT9.16, does not fail with use, or cause physical damage), there is no assurance that subsequent batches will contain ingredients of the same purity, chemical inertness, or sound and sturdy construction. Subsequent batches shall require evaluation and testing according to this standard and ANSI/NAPM IT9.16.

3.2 Paper

Paper and cardboard shall meet the requirements of the photographic activity test as described in ANSI/NAPM IT9.16.

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4) Numbers in brackets refer to corresponding references in clause 2.

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3.2.1 Paper cartons and boxes

Paperboard and corrugated cartons, boxes, or containers that are not in direct contact with the photographic material shall have a pH between 7.0 and 9.5, as determined by the method given in TAPPI T509om.

An alkali reserve shall be the molar equivalent to at least 2% $CaCO_3$, as determined by the alkali reserve test described in ASTM 4988. This alkali reserve shall be accomplished by the incorporation of an alkaline earth carbonate or equivalent. (Compounds such as $MgCO_3$ and ZnO, in molar equivalencies, correspond to approximately 1.6% reserve. This has the same effect as 2% molar equivalencies of $CaCO_3$.). The alkali reserve shall be evenly distributed throughout the paper or paperboard.

3.2.2 Paper enclosures in direct contact with black-and-white images

Paper that is in direct contact with *black-and-white* photographic material shall be made from high alpha cellulose, bleached sulfite, or bleached kraft pulp with an alpha-cellulose content greater than 87%, as determined by the method given in ISO 699 or TAPPI T429cm. The paper shall be free from such highly lignified fibers as groundwood (ASTM D1030 Appendix X5, TAPPI T236cm), alum rosin sizing (TAPPI 408om), particles of metal, and shall contain less than 0.0008% reducible sulfur (TAPPI T406om).

The pH shall be between 7.0 and 9.5, as determined by the method given in TAPPI T509om. The alkali reserve shall be the molar equivalent to at least 2% $CaCO_3$, as determined by the alkali reserve test described in ASTM 4988. This alkali reserve shall be accomplished by the incorporation of an alkaline earth carbonate or the equivalent, as described above. The alkali reserve shall be evenly distributed throughout the paper or paperboard.

A minimum of sizing chemicals shall be used, the amount being dictated by the requirements of the end use (enclosures, overwraps, interleaving, etc.). If sizing is used, neutral or alkaline sizing chemicals (internal and/or surface) shall be employed. Dyes or pigments used to color the paper shall show no bleeding or transfer when soaked in distilled water for 48 hours while held in direct contact with white bond paper.

The surface of the paper shall be free of knots, shives, and other abrasive particles. Surface fibers that might offset onto photographic layers should not be present. The paper shall not contain waxes, plasticizers, or other ingredients that may transfer to the photographic material during storage.

The paper shall meet the physical tests required for the particular application.[5)]

3.2.3 Paper in direct contact with color images

Paper that is in direct contact with *color* or *processed diazo* photographic material shall have the same composition as that used for black-and-white material, except that the cold extraction pH shall not exceed 8.0 and the minimum requirement for an alkali reserve need not apply.

A pH greater than 8.0 potentially may cause increased yellow stain formation and cyan dye fading, especially under prolonged adverse environmental conditions of high relative humidity or immersion in water. It should be noted that the pH of paper will decrease with age, especially when used to enclose acidic photographic materials. For this reason, an alkali reserve is generally recommended for the permanence of the enclosure paper. $CaCO_3$ and $MgCO_3$ at a molar equivalent to 2% $CaCO_3$ will result in a pH greater than 8.0 (approximately pH 8.6 and 9.6, respectively), while ZnO will produce a pH of approximately 7.5. Therefore, to achieve a pH no greater than 8.0, less than a 2% molar equivalent is required when using $CaCo_3$ and $MgCO_3$; ZnO can be used alone at a molar equivalent of 2% $CaCO_3$ or in combination with small amounts of $CaCO_3$ and $MgCO_3$ to achieve a pH of 8.0 or less.

3.3 Plastic

Plastics shall meet the requirements of the photographic activity test as described in ANSI/NAPM IT9.16.

Suitable plastic enclosure materials are photographic film support materials, such as uncoated polyester [poly(ethylene terephthalate)]. In addition, polystyrene, polyethylene, polypropylene, and spun-bonded polyolefins generally have been found suitable as they are usually inert, unplasticized, and have good chemical

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5) Such as ASTM D2176, TAPPI T511om, and TAPPI T414om (refer to annex B).

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stability. Other plastics may be satisfactory, but there has been no extended experience with such materials. *Chlorinated or nitrated sheeting, such as polyvinyl chloride and cellulose nitrate, shall not be used.*

Highly plasticized sheetings or coatings shall not be employed, as this might result in either sticking or ferrotyping of the image surface. Plastics of unknown quality containing residual solvents or plasticizers are suspect, because these chemicals may escape and have a harmful effect on the photographic image.

Plastics used for containers shall contain anti-oxidants and non-halogenated fire retardants, such as antimony oxide.

Most plastic sheeting used for enclosures contains slip agents and anti-blocking agents, in order to lower the coefficient of friction on the surface to prevent blocking of the sheets. In some plastics, these components may migrate from the body of the plastic sheeting to the surface where they redeposit as an oily residue that may transfer to the photograph stored inside the enclosure. In addition, this oily film may attract dust and other foreign matter that could cause abrasion or otherwise deteriorate the photograph. As yet, there is no standard test procedure to evaluate the suitability of slip agents and anti-block agents in plastic enclosures for long term storage of photographs.

The plastic shall meet the physical tests required for the particular application.[6)]

3.4 Metal

Metals used for cores, reels, and containers shall be noncorrodible, such as anodized aluminum or stainless steel. The use of steel is permissible, provided the surface is well-protected by powder coating, tinning, plating, or some other corrosion-resistant finish. Lacquer or enamel that might give off reactive fumes, peroxides, or exudations during storage shall not be used. Metal finishes shall meet the requirements of the photographic activity test as described in ANSI/NAPM IT9.16.

3.5 Adhesive

Adhesives used to cement (paste) enclosure seams and laminate paperboard plies shall meet the requirements of the photographic activity test as described in ANSI/NAPM IT9.16. Some photographic images can be damaged by adhesives which contain impurities such as sulfur, iron, copper, or other ingredients that might attack image silver, gelatin, or film and paper supports. Various adhesives are hygroscopic, thus increasing the possibility of local chemical activity. Many adhesives discolor with age, staining any material with which they are in contact, or fail over time causing enclosure seams to open up. Pressure-sensitive adhesives generally have poor long-term stability characteristics and should be avoided.

Rubber-based products, such as rubber cement, shall be avoided. Not only might they contain harmful solvents or plasticizers; they might also be compounded with photographically damaging sulfur, usually a vulcanizer, accelerator, or stabilizer. Even some "low-desensitizing" or "sulfur-free" rubbers contain sulfur.

3.6 Printing Inks

Printing inks have been known to cause microscopic spots in fine-grain silver microfilm [2]; consequently, there shall not be any printed matter on the inside of the filing enclosure. The ink used for imprinting filing enclosures shall not bleed, spread, or transfer when soaked in distilled water for 48 hours while held in direct contact with white bond paper. Nor shall the ink be a source of products that attack the photograph or the enclosure itself. To ensure that the ink is inactive, it shall pass the photographic activity test outlined in ANSI/NAPM IT9.16.

4 Enclosures

4.1 General

This clause describes several types of enclosures for processed photographic materials and possible materials of construction. The advantages and disadvantages of each are discussed. The choice depends on the degree of protection required, the frequency of use, and the application of the photographic material.

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6) Such as ASTM D2176, ASTM D1922, ASTM D882, and TAPPI T511om (refer to annex B).

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4.2 Enclosure types

Enclosures in close or direct contact with film, plate, or paper include reels, cans, bags, folders, sleeves (sheaths), pocket pages, jackets, envelopes, window mounts or mats, slide mounts, cartons, albums, and aperture cards. All materials used in fabricating enclosures shall comply with the appropriate requirements of clause 3.

4.2.1 Album

An album is a binder or book structure having front and back covers (usually opaque and rigid) in which pages are bound along one edge either by glueing, sewing, or by metal posts or rings.

Photographs stored in albums may be attached to paper pages, that may have protective plastic cover sheets, or inserted into pocket pages or envelopes. In order to protect the three open sides of an album from light and dust, a slipcase may be used (a narrow box with an open end into which the album is inserted) or the album may be placed into a carton or box.

4.2.2 Aperture card

This is a processible card of standard dimensions with one or more openings into which a microfilm frame or frames can be mounted or inserted.

4.2.3 Can

A can is a metal or plastic container for a roll of recording material such as photographic film or magnetic tape.

4.2.4 Carton or box

A carton or box is an outer container that can hold one or more individual units. It may be a fabrication of paper, card stock, or plastic.

4.2.5 Cartridge

A cartridge is a housing for a roll of recording material, such as photographic film or magnetic tape, attached to a single hub or reel.

4.2.6 Cassette

A cassette is a housing for a roll of recording material, such as photographic film or magnetic tape, whose ends are attached to two hubs or reels.

4.2.7 Envelope (bag)

An envelope is a paper or plastic enclosure that is cemented, mechanically joined, heat-sealed, or ultrasonically welded on two edges with a bottom fold and one end open. A cemented bottom seam shall not be used, because the contents tend to slide to the bottom of the envelope. The adhesive used on the edges shall not extend beyond the overlap or into the interior of the envelope. The width of any sealed flaps shall be as narrow as practical to reduce pressure differential effects upon the photographic material.

The envelope may or may not have a protective flap at the open end to provide additional protection against contamination by dust. If a flap is used, it shall not have adhesive or be sealed with tape or rubber bands. If there is no flap, some degree of dust protection is obtained when the open end is not used as the top. Envelopes made from plastic sheeting may also have a sealable mechanism along the open end, such as interlocking grooves, that offer protection against contamination by dust or infiltration of water.

4.2.8 Folder

A folder consists of a single sheet that is folded and does not have cemented seams. Folders may be made from either paper or plastic.[7)]

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7) Enclosures for microfiche frequently have the front side lower than the full height of the back side to permit easy reading of the eye legible header normally found on microfiche and jackets. This modification does not offer as much protection from dirt as a full panel, but makes access to the microfiche very convenient.

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4.2.9 Jacket

A jacket consists of two transparent plastic sheets separated by divider strips with single or multiple film channels made to hold single or multiple microfilm images. Channels may also be formed by heat-sealing, ultrasonic welding, or by a bead of polyester adhesive. The channels shall be designed to permit insertion of the processed photographic material without undue abrasion.

4.2.10 Pocket-style page

A pocket-style page is an enclosure made from two pieces of plastic sheeting heat-sealed or ultrasonically welded along three or four edges and at various points across the sheets to create pouches (pockets) that have slit openings to allow the insertion of the photograph.

Pages are made with multiple pockets having uniform dimensions to accommodate a certain photographic format and size such as slides, film sheets or strips, and reflection prints. The page frequently has holes along one edge to allow the page to be used in ring binders or albums.

4.2.11 Reel (spool)

This refers to a metal or plastic hub or core with flanges (protective sides) onto which film is wound.

4.2.12 Sleeve (sheath)

A sleeve is an enclosure with two seams on opposite sides and both ends open. The seam may be formed with an adhesive, by heat-sealing or ultrasonic welding, or the same result may be achieved by tightly creasing a flap of enclosure material, sometimes referred to as a captive-flap enclosure. If an adhesive is used, it shall not extend beyond the area of the overlap. A sleeve is generally made from plastic sheeting.

4.2.13 Slide mount

This is a structure to retain a film for slide projection. It may be fabricated of paper, plastic, or metal and held together by adhesive or interlocking parts. The photographic film may be encased between two glass plates. The glass may have a coating to reduce the tendency to form Newton rings if the glass comes into contact with the film.

4.2.14 Window mount or mat

This is formed by two sheets of card or paperboard hinged together with an aperture cut in the front sheet to show the image. This is principally used for the storage or display of reflection prints attached to the back card.

4.3 Dimensions

The dimensions of enclosures for processed photographic materials are guided by the dimensions and thickness of the photographic material, and the number of prints, rolls, sheets, plates, or strips to be stored within the enclosure. The enclosure shall be sufficiently large to permit the desired number of photographic materials to be inserted and withdrawn without producing abrasion, and at the same time, be sufficiently close-fitting to prevent excessive movement within the enclosure.

4.4 Seams

This subclause refers to the area where an enclosure has an adhesive bond in its structure. If a cemented (pasted) seam contacts the surface of the enclosed item, staining or other adverse effects may occur in the vicinity of the seam because of the individual or combined effect of an unsuitable adhesive, unsuitable enclosure material, or residual processing chemicals. Therefore, seams shall be cemented on the outside of the envelope and the adhesive shall not extend beyond the seam joint.

Envelopes with center seams may cause pressure distortion, staining, and/or fading throughout the main image area of the photograph stored inside. Likewise, envelopes with bottom seams may cause similar effects when the photograph inside slides to the bottom of the envelope. For this reason, envelopes with center and bottom seams shall be avoided.

The use of envelopes constructed with a bottom fold and two side edge seams avoids these problems and is preferable to other designs. The seam should be as narrow as possible to reduce or prevent distortion of

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the enclosure material. This design will also prevent pressure marks and permanent distortion of the photographic material during long-term storage due to pressure being exerted by the extra thickness of the seam. Wrinkles in the enclosure are another possible source of pressure marks; seams shall be smooth and free of wrinkles. Envelopes shall be sufficiently large to contain photographs without having the interior seam edge coincide with the enclosed photograph.

Photographs having emulsion on only one surface shall be inserted with the emulsion side away from the envelope seams, in order to minimize adverse interactions caused by the seam on the image side of the photograph.

4.5 Material and construction selection

Each material and enclosure type has advantages and disadvantages. Paper is opaque and thus protects the photographic image from light, but the contents must be removed for identification or use. However, paper readily accepts writing. Plastic sheeting, with the exception of colored sheeting or spun-bonded polyolefin sheeting, is generally transparent, permitting easy identification, but offering little light protection. Plastic sheeting is more difficult to form and seal and is subject to dust attraction due to static electricity.

Folders are the easiest to use and they reduce the possibility of abrading the photographic material upon insertion or withdrawal, but they offer the least protection from dust and gaseous contaminants. They are suitable for photographic materials that are used frequently.

Pocket pages, sleeves or sheaths are usually transparent and therefore offer little light protection. Although the photographic image may be abraded during insertion, it is thereafter well-protected from abrasion; the photographic image is easily identifiable and may be viewed without removal from the enclosure. The open ends provide little protection from airborne contaminants. Sleeves or sheaths made of polyester sheeting may cause abrasion during handling if they develop kinks in the surface; pocket pages are generally made from polyolefin plastics which do not tend to form surface kinks.

Jackets, like all plastic enclosures, generally offer little light protection, but good dust and abrasion protection. The photographic image is easily identifiable and may be viewed without removal from the jacket.

Window mounts or mats offer very good handling protection as they are somewhat rigid. They provide a means of easy identification and also protection during display.

Paper or spun-bonded polyolefin envelopes, especially those with protective flaps, offer the best protection from light and airborne contaminants, as well as providing a good writing surface for identifying the content.[8] However, the photographic material is more subject to abrasion upon insertion or withdrawal. Envelopes are a good choice for material with low referral rates.

Slide mounts provide a convenient means of storing films intended for projection. None of the mounts provide protection against light, moisture, or gaseous contaminants. Glass mounts protect the film from abrasion and improve projection performance. However, if the glass does not have a matte surface, ferrotyping or Newton rings may occur. In addition, glass may deteriorate during conditions of elevated temperature and relative humidity resulting in a caustic surface film that is harmful to photographic materials. Glass mounts may trap moisture inside, thereby promoting glass deterioration and mold growth on the interior of the mount.

Cartons or boxes are convenient for storing several individual photographic units and offer good protection from light and dust. More room may be available in the carton or box for identification and indexing. The units may not be held securely, however, if the carton is not full. This may call for individual protection of each unit within the carton, or the use of rigid supports that fill out unused space to prevent slumping and curling of photographs.

Albums are convenient for storing and viewing multiple units of photographs and provide some degree of rigid physical protection. However, albums do not protect from light and dust to the same extent as a carton or box.

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[8] When labelling an envelope or any enclosure, the photograph should not be inside where it may be embossed by pressure from writing.

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Aperture cards, like slide mounts, hold relatively small pieces of film with the intention that the film remains attached to the card during use. This feature is a good choice for photographic material with high referral rates because of the ease of use. However, the open structure offers little physical or elemental protection. Two sets may be used, one for storage and one as a work copy.

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Annex A
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Distinction between film storage copies and use or work copies

The distinction between photographic records that are intended for storage and those intended for use has not always been clear. The value of use or work copies lies in their being available for ready reference. However, as a result of this use, they are subject to dirt, abrasion, fingerprints, contamination with foreign materials, and exposure to excessive light and temperatures. Such use or work copies may become moisture-conditioned to the conditions of the working area, that may be quite different from the storage area where they are filed. In fact, physical distortions of use or work copies can occur if they are not reconditioned to the moisture conditions of the storage area. It is evident that use or work copies of photographic records are not suitable for long-term preservation.

Where there is a need for extended storage of film records, duplicate work copies should be prepared and they should be kept in a collection area separate from the one in which storage copies are stored. Storage copies should meet the requirements of the appropriate American National Standards for the photographic material used, and should be stored according to the recommendations of that standard. Storage records should occasionally be looked at; otherwise, the need for keeping these records is pointless. However, the use of storage copies should be infrequent. If more than infrequent use is required, duplicate work copies should be printed from the storage copies.

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Annex B
(informative)

Bibliography

ASTM D882-1997, *Standard test method for tensile properties of thin plastic sheeting* [1)]

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